Success Story

Discovering the International Space Station

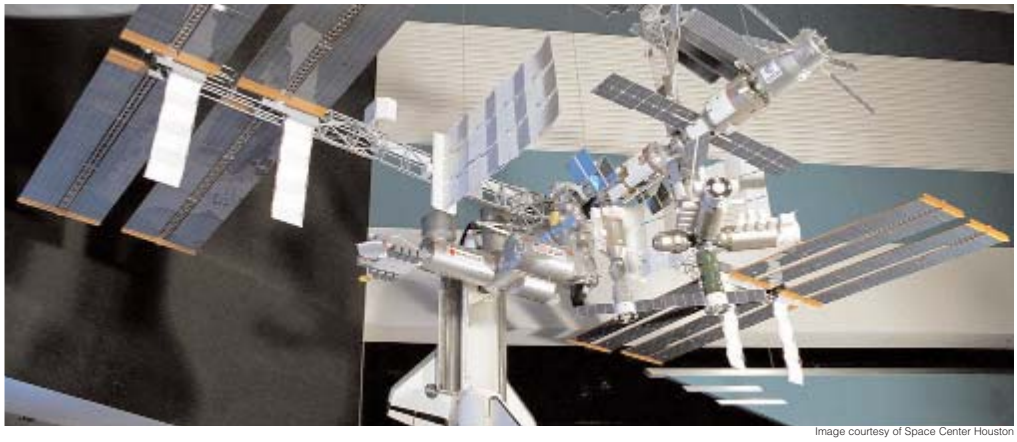

Image courtesy of Space Center Houston

SGI® Technology Gives Space Center Houston Visitors the Feel of Space

The Challenge

- Replace a small model of the International Space Station on exhibit at Space Center Houston with a more comprehensive and larger model
- Create a compelling presentation that can both instruct and entertain
- Give visitors an opportunity to sense the challenges involved in navigating throughout the space station

The Solution

- An interactive space simulator powered by six Silicon Graphics® Octane2™ visual workstations and OpenGL Performer™ graphics software creates a nearly photo-realistic representation of the interior and exterior of the International Space Station

The Result

- The entertaining interactive exhibit attracts more visitors to Space Center Houston, helping it fulfill its mandate to educate the public about the history, achievements, and goals of the nation's space program

Traveling 250 miles above the Earth at 17,500 mph, the International Space Station (ISS) will be 361 feet long when completed in 2006, as big as two football fields side by side. It's taken the cooperation of 16 nations to make the ISS a reality, and it will require 43 separate flights to assemble. But until recently, this enormous undertaking was represented at Space Center Houston by a structure not much bigger than a child's toy model.

The high resolution model realistically depicting the interior and exterior of the International Space Station was donated by the European Space Agency, one of NASA's ISS partners, for incorporation into the exhibit.

As the official visitors center of NASA's Johnson Space Center, Space Center Houston houses 50,000 square feet of exhibits detailing the history of America's space program. But given its status as a nonprofit organization funded solely by private contributions, it has had limited resources to fully develop all the presentations that will educate, entertain, and fuel the imaginations of today's youth, who could become tomorrow's astronauts or space engineers.

SGI executives approached Space Center officials with a novel proposal: to provide visualization workstations that would enable its visitors to virtually "float" both inside and outside the ISS, while actually sitting in front of a computer display. "We were very intrigued with this idea," said Celina Ducceschi, Space Center Houston exhibits manager. "We desperately needed to expand our information about the ISS. We knew that allowing the general public to 'walk' in and out of the Space Station would create a very compelling presentation."

To complement the exhibit, Space Center Houston officials also decided to replace their existing shoebox-sized model of the ISS with a much larger, fully detailed version. The new 30-foot replica would hover over the SGI simulator and give attendees a further opportunity to carefully examine the entire station. Created by ASM of Samara, Russia, the $100,000 project would take seven months to build and be the world's largest representation of the ISS.

For the past 10 years, SGI has been one of the leading technology suppliers to the nation's

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"Our visitors rate their interactive experience as one of the high points of their visit."

Celina Ducceschi,
Exhibits Manager,
Space Center Houston

Image courtesy of Space Center Houston

space program. For example, SGI technology is currently being used by NASA scientists to perform preliminary high-definition film analysis within hours of a shuttle launch and provide more detailed film analysis the day after launch at the NASA Ice/Debris Team's Image Analysis Facility at Kennedy Space Center in Florida. And astronauts at the Johnson Space Center practice extra-vehicular activity space walks using a shuttle mission simulator powered by three Silicon Graphics® Onyx2® eight-pipe visualization systems.

"With our role as the primary supplier of visual systems to NASA's training programs, SGI understands the importance of helping visitors comprehend the program's extraordinary scientific contributions," said Thomas Stanley, director, Civilian Agencies, SGI, "with the Space Center Houston project, we had a unique opportunity to use that same technology to educate the public, in a compelling, visually complex manner, about the complexities and challenges surrounding this critical element of our space program."

Working closely together, SGI and Space Center Houston devised a unique concept for the proposed exhibit. A sign beckons attendees to "Take a virtual tour of the International Space Station." Visitors enter the exhibit through a 20-foot cylinder, a truncated structure designed to look like a node of the actual station. Six kiosks, built at different heights to accommodate both children and adults, are situated on distinct planes within the node, like spokes on a wheel. The space-walk visuals are displayed on individual 20-inch displays supplied by SGI, and each display's graphics are created with one of six Silicon Graphics Octane2 visual workstations.

The virtual astronauts not only explore many parts of the station from a first-person point of view, but do so as if they, like actual astronauts, were traveling with the slow, gentle movements characteristic of a weightless environment. Move through the Space Station too rapidly, and you'll bounce uncontrollably off a wall, as would an actual station resident.

Image courtesy of Space Center Houston

"For the first time, Space Center Houston visitors are able to experience what it's like to use a simulator similar to the ones we provide America's space program," Stanley said. "Utilizing SGI OpenGL Performer graphics software, we've been able to create a compelling environment, complete with 3,000 accurately placed stars, that mimics what our actual astronauts experience when they're in the ISS."

The new installation opened this past January and has rapidly become one of the most popular exhibits at the center. "The control booths are never empty," said Celina Ducceschi. "Our visitors rate their interactive experience as one of the high points of their visit."

"We're very proud to have such a well-developed professional presentation as that provided to us by SGI," Ducceschi added. "Frankly, before the new exhibits, we didn't speak enough about the ISS. But now, we're much better able to explain the importance and success of our nation's space station efforts. SGI's contribution really helps us fill what was a serious void in our work and do it in a most compelling way."

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